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Spruce budworm
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INFORMATION ON THE SPRUCE BUDWORM
IN IDAHO AND MONTANA.

Until a few years ago the spruce budworm (Cacoecia fumiferana Clem.) was regarded as an eastern insect and was not feared as a potential problem within our western forests. In 1922 this insect was discovered in two regions in the state of Idaho and the following season it was found in the Yellowstone National Park where it had apparently been established throughout the states of Idaho, Montana and Wyoming and has been reported from New Mexico.

In our western forests the larvae of the spruce budworm has been collected from white fir, Douglas fir, Engelman spruce, western larch, western hemlock, white pine, yellow pine, and lodgepole pine. With most of these hosts only the new needles are eaten, the attack extending to the old foliage only when there is a shortage of food material. In this region the preferred hosts are apparently Douglas fir and white fir. The severest damage which has occurred from the present outbreak of this insect in the west has been in pure Douglas fir stands. In the Yellowstone National Park a pure stand of Douglas fir, several hundred acres in extent, has been completely killed by the spruce budworm during the past few years.

The adult insect, which is a small brownish moth with a wing expanse of approximately 1 inch in width, is to be seen flying early in August. Eggs are soon after deposited in light green inconspicuous masses on the under side of the needles. These eggs hatch in 10 to 12 days and the young larvae construct small cocoons under flakes of bark or other sheltered places in which they pass the winter. It is not definitely known if these young larvae feed before hibernation or not, but if so it is very sparingly. The following spring the over-wintering larvae leave their cocoons and bore into the buds just as they are opening. The worms develop very rapidly and are usually full grown by the last of July. When mature the caterpillars, or worms, are approximately 1 inch in length, of a deep brown color with pale green markings and numerous wart like growths along the sides. When mature the larvae pupate within chrysalids attached to twigs, etc. by a few silken threads. The pupal stage of this insect lasts from 10 to 12 days.

The spruce budworm attack is easily recognized by the blighted appearance of the tips of the limbs where the new needles have been destroyed. Nests are constructed by the caterpillars by binding the needles which have been gnawed off at the base together with silken threads. When disturbed

they hide in these nests and if touched drop from the limb and hang by a thread on which they climb back to their homes.

The thoughts of controlling epidemics of this insect by artificial methods seems to be impractible due to the expense involved. Outbreaks of the spruce budworm cover thousands of acres which would need be sprayed or dusted with a stomach poison in order to destroy the feeding caterpillars. With the development of lighter and heavier than air machines it is possible that outbreaks could be controlled by dusting from such equipment. However at this time the only feasible thoughts of control lie in the protection, by spraying, of trees of high esthetic value around parks, camp sites, etc. For the protection of trees of this character the following formula should be used:

1 gallon of fish oil
25 pounds arsenic of lead powder
400 gallons of water.

This spray should be applied as the new buds are opening.

In the eastern United States and Canada the spruce budworm has been responsible for the destruction of a tremendous volume of timber. The extent of the loss through the western states as a result of the various outbreaks of this insect during the past few years is not definitely known. What the future of the present and subsequent epidemics may hold in store for us is problematical. However we may be assured that the spruce budworm is now established as an important western forest insect and will need be considered in future plans of intensive forestry.

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